

**CLAIMS**

What is claimed is:

1. A wire bonding machine for bonding a wire to a semiconductor device, the wire bonding machine comprising:

a wire bonding head having a bonding tool mounted to it, the bonding tool adapted to attach a wire end to a semiconductor device, the bonding head having at least a portion which is pivotable about a first horizontal axis, the bonding tool being mounted to the pivotable portion so as to be vertically movable, the bonding head being rotatably mounted to the bonding machine so as to permit rotation of the bonding tool about a vertically oriented rotational axis;

a work table for supporting at least one semiconductor device to be wire bonded; and

a conveyance system for translating the work table in one direction relative to the bonding head.

2. A wire bonding machine according to claim 1 further comprising a second wire bonding head mounted above the conveyance system.

3. A wire bonding machine for bonding a wire to a semiconductor device, the wire bonding machine comprising:

a wire bonding head having a bonding tool mounted to it, the bonding tool adapted to attach a wire end to a semiconductor device, the bonding tool being rotatable alone or in combination with at least a portion of the bonding head about an axis extending along a substantially horizontal axis, and about an axis extending along a substantially vertical axis;

a work table for supporting at least one semiconductor device to be wire bonded; and

a conveyance system for translating the work table in a substantially horizontal direction and substantially orthogonal to the horizontal axis about which the bonding tool rotates.

4. A wire bonding machine for bonding a wire to a semiconductor device, the wire bonding machine comprising:

a wire bonding head having a bonding tool mounted to it, the bonding head being mounted to the wire bonding machine so as to permit vertical displacement and rotational displacement of the wire bonding tool, the rotational displacement being about a vertical axis;

a work table for supporting at least one semiconductor device to be wire bonded; and

a conveyance system for translating the work table in a substantially horizontal direction.

5. A wire bonding machine according to claim 4 wherein the bonding tool is rotatable alone or in combination with at least a portion of the bonding head about a substantially horizontal axis.
6. A wire bonding machine according to claim 5 wherein the conveyance system translates the work table in a substantially horizontal direction.
7. A wire bonding machine according to claim 6 wherein the conveyance system translates the work table in a direction, substantially orthogonal to the horizontal axis.
8. A wire bonding machine according to claim 4 wherein the at least one semiconductor device is positioned in a magazine with at least one other semiconductor device.
9. A wire bonding machine according to claim 8 further comprising a magazine handler for feeding the magazine to the conveyance system.
10. A wire bonding machine for bonding a wire to a semiconductor device, the wire bonding machine comprising:

a fixture supporting at least one semiconductor device to be wire bonded in a substantially horizontal plane; and

a wire bonding head including a bonding tool secured thereto, the bonding head rotatably mounted to the wire bonding machine to permit rotation of the bonding tool about a rotational axis, the rotational axis substantially vertical with respect to the horizontal plane.

11. The wire bonding machine according to claim 10 further comprising a conveyance system for translating the fixture in at least one direction in the horizontal plane.

12. The wire bonding machine according to claim 11 wherein the bonding head has a longitudinal axis and the conveyance system translates the fixture in a direction at an acute angle with respect to the longitudinal axis of the bonding head.

13. The wire bonding machine according to claim 10 wherein the bonding tool is rotatable about a horizontal axis, the horizontal axis substantially parallel to the horizontal plane for movement of the bonding tool in a vertical direction.

14. The wire bonding machine according to claim 13 wherein at least a portion of the wire bonding head is rotatable about the horizontal axis and the bonding tool is secured to the portion of the wire bonding head to rotate about the horizontal axis.

15. The wire bonding machine according to claim 10 further comprising a motor drive assembly mounted or engaged with the bonding head on an opposite side of the rotational axis from the bonding tool.

16. The wire bonding machine according to claim 15 wherein components of the bonding head have a mass that is substantially balanced on opposite sides of the rotational axis.

17. The wire bonding machine according to claim 10 further comprising a second wire bonding head including a bonding tool secured thereto, the second bonding head rotatably mounted to the wire bonding machine to permit rotation of the bonding tool about a second rotational axis, the second rotational axis substantially vertical with respect to the horizontal plane.

18. The wire bonding machine according to claim 10 further comprising a camera directed toward the fixture for receiving an image of the fixture or the at least one semiconductor device.

19. The wire bonding machine according to claim 18 wherein the camera is secured to the bonding head.

20. The wire bonding machine according to claim 18 wherein the camera is mounted to a camera conveyance system which carries the camera in a direction in the horizontal plane.